

Honker, William

From: Rauscher, Jon
Sent: Monday, March 07, 2016 4:00 PM
To: Honker, William; Garcia, David; John, Forrest; Cook, Robert; Turner, Philip
Subject: FW: Pre-event conditions - Gold King Mine

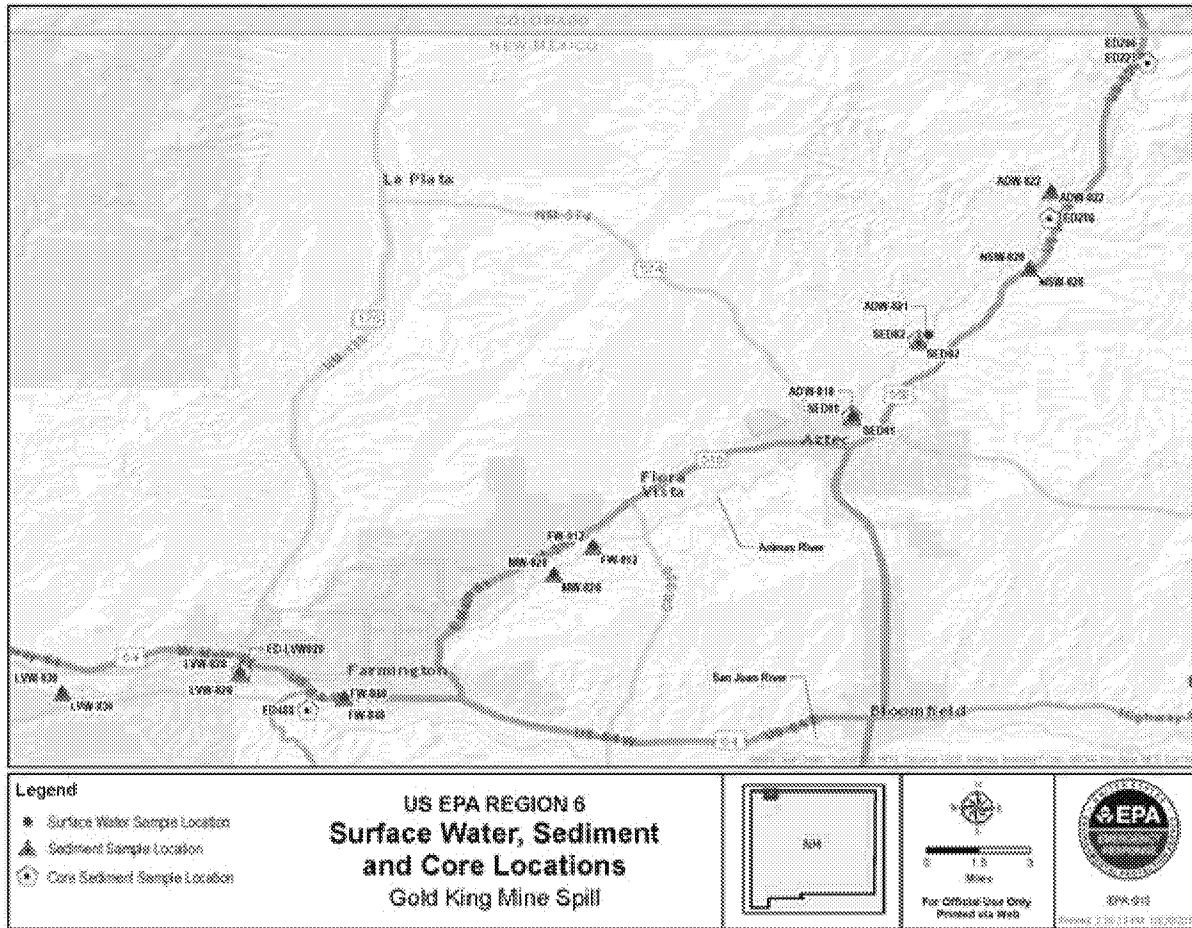
From: Smith, Monica
Sent: Friday, November 13, 2015 4:44 PM
To: trais.kliphuis@state.nm.us
Cc: Crossland, Ronnie; Foster, Althea; Rauscher, Jon; Garcia, David; Phillips, Pam; Edlund, Carl; Gray, David
Subject: Pre-event conditions - Gold King Mine

Trais,

Below is draft write up that Secretary Flynn asked Sam if we could take a look at creating for you regarding sampling data from the Animas and San Juan Rivers in New Mexico. The draft shows the concentrations of the 24 metals including arsenic, cadmium, lead and mercury in surface water and sediment have returned to pre-event conditions and we invite your comments. As you mentioned on our recent call, your team will have questions on the draft and we can discuss those further at your convenience. We would also like to see if you have any data that should be included.

Surface water samples in the Animas and San Juan Rivers in New Mexico were collected before (August 6, 2015 and August 7, 2015) and after arrival of the pulse of water (August 8 through October 14) at nine (9) sampling locations (Figure 1). Over 460 surface water samples were analyzed for 24 metals including arsenic, cadmium, lead and mercury. Along the Animas River and San Juan River in New Mexico, the concentration of dissolved metals did not appear to substantially change as the pulse flowed downstream.

Figure 1. Surface Water, Sediment and Core Locations in New Mexico.



The levels of dissolved metals on August 8, 2015 and subsequent sampling events are similar to the levels prior to the impact of the spill (August 7, 2015) (Table 1). Heavy rain events both locally (New Mexico) and in Colorado caused periodic short-term fluctuations in dissolved metal concentrations. These fluctuations lasted approximately one day. The heavy rainfall events included a severe thunderstorm in northwestern New Mexico (August 26, 2015), and intense rainstorms in southwestern Colorado during September (September 5, 2015 and September 22, 2015). The day after the rainfall events, the surface water results for the Animas and San Juan Rivers typically returned to pre-storm conditions and to pre-event conditions.

Table 1. The table below compares pre-, during and post-spill surface water dissolved metal concentrations (µg/L) for arsenic (As), cadmium (Cd), lead (Pb) and mercury (Hg) (assumed water hardness of 192 mg/L) for four of the nine locations (five locations were not sampled prior to the pulse reaching New Mexico):

Location	Metal	NM Chronic WQS	GKM Screening Level	08/07/15 (pre)	08/08/15 (during)	08/09/15 (post)	09/14/15 (post)	10/14/15 (post)
ADW-022	As	150	50	0.54 J	0.5 J	0.37 U	0.61 J	0.37 U
	Cd	0.72	83	0.1 U	0.04 U	0.04 U	0.5 U	0.04 U
	Pb	5	200	0.06 J	0.25 J	0.33	0.55	0.34 J
	Hg	0.77	50	0.2 U	0.08 U	0.08 U	0.08 U	0.08 U
ADW-021	As	150	50	0.52 J	0.37 U	0.37 U	0.37 U	0.37 U
	Cd	0.72	83	0.1 U	0.04 U	0.04 U	0.5 U	0.04 U
	Pb	5	200	0.3 U	0.15 J	0.08 J	0.09 J	0.3 U
	Hg	0.77	50	0.2 U	0.08 U	0.08 U	0.08 U	0.08 U
FW-012	As	150	50	0.74 J	0.38 J	0.37 U	1	0.37 U
	Cd	0.72	83	0.1 U	0.04 U	0.04 U	0.5 U	0.04 U
	Pb	5	200	0.3 U	0.14 J	0.84	0.68	0.3 U
	Hg	0.77	50	0.2 U	0.08 U	0.08 U	0.08 U	0.08 U
LVW-FD LVW-030	As	150	50	1.1	0.76 J	0.49 J	1.2	0.58 J
	Cd	0.72	83	0.1 U	0.04 U	0.04 U	0.5 U	0.04 U
	Pb	5	200	0.18 J	0.5	1.1	0.57	0.06 U
	Hg	0.77	50	0.2 U	0.08 U	0.08 U	0.08 U	0.08 U

Definition of laboratory qualifiers: U = Not detected at lab reporting limit; J = Estimated result that is greater than method detection limit but less than the reporting limit. NM Chronic WQS = State of New Mexico Chronic Water Quality Standards (<http://164.64.110.239/nmac/parts/title20/20.006.0004.pdf>) added at the request of New Mexico Environment Department. Gold King Mine (GKM) screening level for surface water is based upon a 60-day recreational user.

The EPA collected over 430 sediment samples at nine (9) sampling locations along the Animas and San Juan Rivers in New Mexico (Figure 1), and the sediment samples were analyzed for 24 metals including arsenic, cadmium, lead and mercury. Sediment samples were collected from the sediment surface (top 0 - 0.5 centimeter) which is the sediment most likely to have material deposited from the Gold King Mine spill. However, neither EPA nor New Mexico Environmental Department (NMED) had pre-event metal data for sediment. To identify potential pre-event information, EPA conducted core sampling to collect sediment from historical deposition prior to the Gold King Mine spill. The sediment core samples were collected from seven locations along the Animas River and San Juan River at the recommendation and in consultation with the NMED (Figure 1). The sediment core locations were considered to be potential areas of sediment deposition. At the sediment core locations, sediment surface and sediment core samples (3 cm – 6 cm) were collected. The concentration of metals in the core samples represent historical sediment levels (prior to the spill) and the surface sediment samples represented current sediment depositions. The results of the surface sediment samples and the sediment cores samples had similar metal concentrations. This similarity indicates that the Gold King Mine spill did not substantially change the concentration of metals in surface sediment.

Table 2. The table below compares sediment metal concentrations (mg/kg) for lead (Pb) and zinc (Zn) for three of the nine locations (six locations were not sampled for sediment cores):

Location	Metal	PEC screening level	GKM Screening Level	Core Sediment SED02 & FW-012 (09/03/15) LVW-0202 (09/02/15)	08/11/15 (post)	Surface Sediment SED02 & FW-012 (09/03/15) 09/02/15 (LVW-0202)	10/14/15 (post)
SED02 (ADW-021)	Pb	128	20,000	13J	43	13J	10
	Zn	459	1,000,000	53	190	53	51
FW-012	Pb	128	20,000	13J	130	13J	15
	Zn	459	1,000,000	49	200	49	62
LVW-020	Pb	128	20,000	3.6	4.1	4.4J	2.8
	Zn	459	1,000,000	12	15	16J	8.9

Definition of laboratory qualifiers: J = Estimated result that is greater than method detection limit but less than the reporting limit. Probable Effects Concentrations (PECs) for lead and zinc (MacDonald et al. 2000) were added at the request of New Mexico Environment Department (NMED). Gold King Mine (GKM) screening level for sediment is based upon a 60-day recreational user.

In addition to these direct measurements, EPA also evaluated previous sediment sampling results from the U.S. Geological Survey (USGS). Specifically, in southern Colorado and New Mexico, the USGS collected sediment samples from 1986 through 2000 at locations along the Animas River and San Juan River (publicly available data from the USGS National Water Information System (NWIS) website (<http://waterdata.usgs.gov/nm/nwis/qw/>)). Twelve (12) USGS sediment samples were collected at a location on the Animas River in southern Colorado near the town of Cedar Hill, New Mexico, and had detections of lead and zinc as high as 340 mg/kg and 1,300 mg/kg, respectively. The lead and zinc levels in sediment from the EPA sampling locations along the Animas River between the towns of Cedar Hill, New Mexico and Flora Vista, New Mexico were consistently below those concentrations. Six (6) USGS sediment samples were collected at a location on the Animas River near Farmington, New Mexico, and had detections of lead and zinc as high as 60 mg/kg and 450 mg/kg, respectively. The lead and zinc levels in sediment from the EPA sampling locations along the Animas and San Juan Rivers near Farmington, New Mexico, were below these concentrations. Based on a review of Table 2, current metal concentrations in sediments are in line with values from core samples and previous sampling events conducted by USGS.

Look forward to hearing from you. Monica

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